Three Band Thermal Infrared Detector for CubeSats and UAS, Phase I

Completed Technology Project (2018 - 2019)

Project Introduction

The overall objective of the SBIR is to develop a high performance, inexpensive, three-band thermal infrared camera system, suitable for deployment in Unmanned Airborne Systems and CubeSats. This imaging system will be capable of mapping thermal features on the surface of the earth with a high revisit rate and high spatial resolution. Xiomas believes the Three Band Infrared Detector (TBIRD) System will see significant demand as a small multiband thermal sensor onboard small to medium sized unmanned airborne vehicles (UAV) and space-based cubesat applications, in both the commercial and military markets.

Xiomas has extensive experience in most of the fundamental technologies proposed. In Phase II we propose to develop a flight ready TRL 7 prototype, with the final six months of Phase II dedicated to instrument calibration and characterization, environmental tests (shock, vibration, temperature, etc.), and flight tests in manned or unmanned small aircraft.

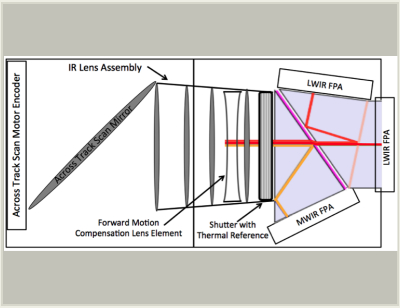
The system will be useful for a wide variety of environmental research, disaster response, wildfire science, wildfire detection and mapping, oil spill mapping and detection, and thermal anomaly mapping in general.

Anticipated Benefits

Xiomas believes the proposed sensor system will support NASA's Earth science program and the effort to develop a scientific understanding of Earth's system and its response to natural or human-induced changes, and to improve prediction of climate, weather, and natural hazards, and we take this opportunity to reiterate the importance we attach to developing technology which not only performs at a very high level but also reduces mission cost.

Also applies to recent ROSES solicitation for CubeSats

The system will be useful for a wide variety of environmental research, disaster response, wildfire science, wildfire detection and mapping, oil spill mapping and detection, and thermal anomaly mapping in general, such as ground water mapping.



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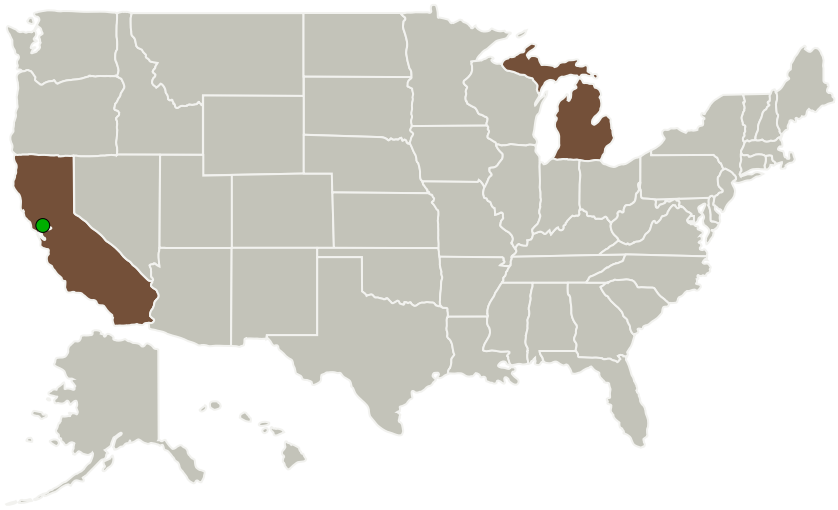
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Xiomas Technologies	Lead Organization	Industry	Ypsilanti, Michigan
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Michigan

Project Transitions

July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137573)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Xiomas Technologies

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

John M Green

Co-Investigator:

John C Green

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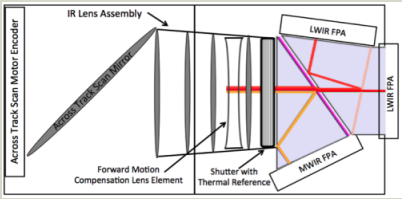
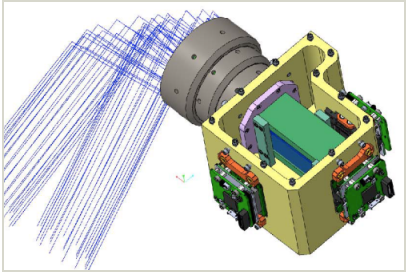
Images



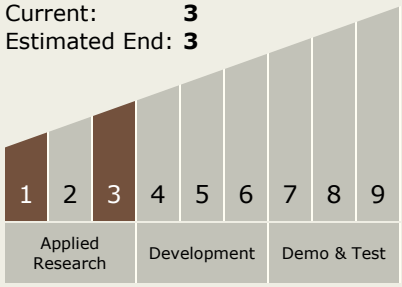
Briefing Chart Image
Three Band Thermal Infrared Detector for CubeSats and UAS, Phase I
(https://techport.nasa.gov/image/133648)



Final Summary Chart Image
Three Band Thermal Infrared Detector for CubeSats and UAS, Phase I
(https://techport.nasa.gov/image/133359)

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destination

Earth